# RANGE IMPROVEMENT NOTES

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## INDEX



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## STATEMENT OF PURPOSE

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This publication is printed primarily to inform professional range administrators of important range improvement and management developments and findings. These "notes" may include extracts of published work, unpublished reports on administrative studies and personal observations or suggestions of other range administrators. No claim is made as to the accuracy or completeness of studies or conclusions drawn.

All who read these RANGE IMPROVEMENT NOTES are encouraged to submit material for publication, or suggestions for improving its usefulness. Full credit will be given for any material used.

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# INTRODUCTION OF PANEL ON MULTIPLE USE*

By
Floyd Iverson**

The American Society of Range Management has chosen a timely topic for discussion at this meeting - multiple use - a subject of wide interest and a management concept of considerable debate. For myself, it is a real privilege to serve as moderator for the panel that will cover this subject. Multiple use and its application to areas of land is something I am associated with practically every day.

We all look forward to the individual presentations of this very able panel on multiple use. The Society is, indeed, fortunate to have these outstanding leaders come to us today and discuss multiple use in their respective fields of endeavor.

Before introducing the first member of the panel, I would like to do a little spade work about this term "multiple use." I won't take time to go into detail about its history as a concept of land management. We do know this concept - or philosophy - has been with land managers for a long period of time. Certainly during the early-day conservation movement in America, some leaders were thinking multiple use when they talked of wise use of resources. But, they probably had little idea of the degree that multiple use could and would be applied to private and public land as it exists today.

So, multiple use has been with us as a resource management way of life, in one form or another, for a number of years. But it is just now emerging as a more or less publicly understood concept of management applied to the land. As such, it is undergoing the growing pains of a new concept.

Like any concept, multiple use has its very strong advocates. There are those who feel it represents the only land management philosophy which can meet the needs of American citizens now and in the years ahead. Multiple use has its opponents, too, in the controversial school of single use vs. multiple use. Treatises have been written about multiple use and how it cannot be applied and represent the best interest of certain groups. There are those, too, who are so critical as to call it "multiple abuse" against the land.

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*Presented at 18th Annual Meeting of American Society of Range Management, Las Vegas, Nevada, February 9-12, 1965.

**Regional Forester, Intermountain Region, Forest Service, U.S. Department of Agriculture.

Multiple use is, however, a fast growing concept of land management. Many groups and interests are attracted to the brightness of what may be to them a new idea and embrace it for its growing public appeal. Just recently in Utah was created our newest National Park - Canyonlands - a magnificent area of superb undeveloped scenic attractions. Prior to Congressional passage of the Canyonlands Bill, great public and private debate whirled over whether or not this should be a "multiple-use National Park."

This example, and there are others of which you are aware, illustrates the fact that multiple use means different things to different people. But, we here today are concerned with its application to the management of land areas and the resources that can be produced therefrom. It is to this point that our panel will show us how this is done in each area of their interest. For a multiple use philosophy that does not produce results out on the Forest and range is only an ivory-towered dream. Multiple use must be practical to be applied; multiple use must be proven to be accepted by land owners; and multiple use must be understood to be supported by the general public.

Our panel members today will, I am sure, cover the relationships of the resource or activities, which they will be discussing, with the range resource and range management, which is of particular interest to this Society. They will also wish to cover the ways in which range management is important because of its possible enhancement of other resource uses and activities, and to bring out ways in which modifications in range practices may minimize adverse effects upon other resource uses and activities.

Panel members are:

H. R. Glascock, Jr. - Western Forestry and Conservation Association
Hugh A. Shamberger - Assistant Director, Desert Research Institute, University of Nevada
Bill K. Cooperrider - Supervisor, Modoc National Forest
W. W. Dresskell - Regional Director, Bureau of Outdoor Recreation
C. R. Gutermuth - Vice-President, Wildlife Management Institute
Bill Davis - Executive Secretary, Arizona Cattle Growers Association

# HISTORY OF CHEMICAL CONTROL OF BRUSH, THE SUCCESSES, FAILURES, AND NATIONAL NEEDS*

By
Hurlon Ray**

The use of herbicides worldwide has substantially increased since the development of 2,4-D and 2,4,5-T in the early 1940's. Certainly the discovery and development of 2,4-D rank in importance with the discovery and development of penicillin and the Salk vaccine. The explosive development of tree, brush, and weed killers has brought about a major revolution in range management, forest management, and agricultural and horticultural practices in the United States.

Controlling, eliminating, or slowing down the rapid invasion of brush on our grasslands has long been of concern and importance to the nation's cattlemen. Particular emphasis has been given during the past ten years to selective control of hardwoods on pinelands. Equal attention is now being focused on aquatic plant control, grass control, and control of noxious plants on rights-of-way and ditchbanks. The use of herbicides in the production of food is one of the most exacting of today's agricultural practices.

## Early Work in Chemical Brush Control

Dr. L. J. Audus, in his new book entitled "The Physiology and Biochemistry of Herbicides," states that the first use of organic chemicals for weed control is contained in a patent (1935) by Truffant and Pastac, covering the use of nitrophenols as selective herbicides.

In the late 1930's and early 1940's, Dr. E. D. Whitman conducted studies of synthetic plant hormones as part of a post-graduate research fellowship at Ohio State University. Some of the other researchers working on growth regulators at this time were E. J. Kraus, J. W. Mitchell, P. C. Marth, G. W. Merck, A. G. Norman, and C. E. Minarik. In 1941 Kraus, Mitchell, and others decided that if toxic properties of growth-regulating substances were to be utilized for the destruction of crops or the limitation of crop production, then attention should be given to defensive measures that could be employed. These scientists

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*Abstract of paper presented at the 18th Annual Meeting of American Society of Range Management, Las Vegas, Nevada, February 9-12, 1965.
**SCS, Albuquerque, New Mexico

stated that such studies could demonstrate any value as offensive tools that such compounds might possess. These suggestions were called to the attention of certain groups of scientists that had been organized to consider the problems of national defense. The work soon became part of the program of biological warfare, and the results of the studies were promptly placed under restriction.

A trial conducted in January of 1943 - in a greenhouse at the University of Chicago - was most encouraging. Mitchell and Marth were probably the first to kill weeds in the field with phenoxy aliphatic acids.

Specific experiments using 2,4-D and 2,4,5-T were carried out at the University of Chicago and at Beltsville from August 1941 to May of 1944. As far as it is presently possible to determine, evidence that 2,4-D and related compounds might have promise as possible herbicides was first published by J W. Mitchell and C. G. Hamner in 1944 in the Botanical Gazette. Apparently the first published evidence that pre-emergence treatment of soil with 2,4-D might be of use in controlling weeds appeared in the Botanical Gazette in March of 1946, by Drs. J. W. Mitchell and Paul C. Marth.

In the spring of 1944 Dr. Whitman made his first field tests with 2,4-D on meadow weeds such as dock and dandelion in Columbus, Ohio. Full-scale commercial sales of 2,4-D were begun early in 1946.

At the request of ranchers and livestock raisers in the Rolling Plains of Texas, the Texas Agricultural Experiment Station started research in 1934, under the leadership of C. E. Fisher, in an attempt to develop more efficient methods of controlling mesquite.

Brush-control investigations for the suppression of post and blackjack oak and other associated hardwood species were started on the former Red Plains Conservation Experiment Station near Guthrie, Oklahoma, in 1935, under the leadership of Harry M. Elwell.

In 1938 R. E. Street and E. B. Stanley - working in Arizona - reported effective kills by poisoning mesquite with sodium arsenite. Later this work was continued by K. W. Parker and S. Clark Martin of the Southwest Forest and Range Experiment Station.

On June 1, 1943, Elwell tried a formulation of 2,4-D (9.6% concentration), using three ounces of the compound in three gallons of water, as a wetting leaf and twig spray on a small plot of post and blackjack oak. In the spring of 1948, samples of 2,4,5-T were received and tested

by Elwell. Oklahoma ranchers who participated in this work were John McKenna, Alex; Albert Kelly, Bristow; and George McKinley and Rich Labadick, Pawhuska.

In July of 1946, Dr. E. B. Stull made an aircraft application of herbicides to control oak sprouts and willows on Deer Creek in Webster County, Kentucky.

One of the first large-scale, aerial applications of herbicides to control mesquite was done by Dr. E. B. Stull on the Flat Top Ranch at Walnut Springs, Texas, June 7, 1948. The same year - after the application appeared successful - 16,000 additional acres in various areas of Texas were sprayed.

In 1949 - after testing some 80 different formulations of 2,4-D and 2,4,5-T with ground equipment - Fisher used aerial application to determine optimum dates and rates of application.

The first treatment by aerial application of chemicals - of brush and hardwoods on pinelands in the South - took place in Arkansas in May of 1951.

In the winter of 1954 and the spring of 1955, seventy plots were established in Arkansas to study the use of the tree injector. Today over 20,000 tree injectors have been sold.

The first public demonstration of the Bifluid System was conducted May 20, 1960, at San Antonio, Texas. The urgent need for a safe, efficient means of herbicide application had led to the invention and development of the Bifluid System.

Needs

Despite all the dollars spent on chemical plant control, and all the successes demonstrated, brush invasion continuously increases with an astonishing associated loss in forage production. As the nation looks to the future in regard to management of grassland, forestland, cropland, and wildlife land, obviously livestock men and farmers must plan production around grass and agriculture in order to develop more efficient programs to assure permanency of agricultural enterprises in our country.

The selective control of woody plants could be beneficial on more than 250 million acres of timberland, on about 320 million acres of rangeland,

and on undetermined millions of acres of rights-of-way and ditchbank and railroad works. If our population increases 40 percent by 1980, the demand for meat produced from grazing animals will probably rise 80 percent. Best estimates indicate that to meet these forage requirements an increase of 60,000,000 acres will be needed in pasture and rangeland.

Needed brush control on some of the federal land in the United States is about as follows: Bureau of Land Management - 31,300,000 acres; Bureau of Indian Affairs - 3,000,000; and U. S. Forest Service - 4,000,000.

Since 1937 over 55 million acres have been treated. The present rate of brush-control work is about 2 million acres per year. Approximately 20 million acres have been sprayed in the last 10 years. About 2 million acres of private lands per year are being lost to the continuing, rapid encroachment of undesirable brush and other woody vegetation. Of the 55 million acres of brush that have been treated since 1937, over 60 percent needs re-treatment.

The total acreage on which the Agricultural Conservation Program has cost-shared - from 1937 through 1964 - has reached 50 million. Much of this land needs continuous follow-up work. The acreage has ranged from as low as 681,456 per year to as high as 3,348,759. In 1962, ACP cost-share assistance was given on 1,978,173 acres, with a total of $6,221,089 paid in cost-shares. In 1963, ACP cost shared on the treatment of 2,036,057 acres, with cost-sharing of $6,273,768.

As of June 30, 1964, the Great Plains Conservation Program had cost-shared on 1,897,962 acres with a total payment of $4,786,169.27.

Summary

Today the rancher, woodland owner, and farmer have access to a very wide array of tree-, brush-, and weed-killing chemicals. The proper chemical and best method of application vary with the planned crop objectives of the landowner, kind of plants to be controlled, and the sequence of events that occur in plant successions when the native vegetation is killed or disturbed.

Chemical plant control research must be conducted by weed-, brush-, watershed-, and ecologically minded men and by men who have knowledge of factors affecting the maintenance of adequate living conditions for wildlife. The chemical plant-control job in the United States encompasses land used for food crops, grasslands, forest, wildlife areas, rights-of-way, canals, ditches, industrial areas, parks, urban developments,

recreational areas, rivers, and lakes. The needs are so great and the job of such size that a new look at our present research program is imperative in order to get it realigned to provide reasonable and proper liaison among all concerns interested in chemical plant control. The use of each new chemical compound for herbicidal, pesticidal, or other such benefits should be evaluated with regard to possible influence on the welfare of man, wildlife, and nature.

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## SAFETY MESSAGE

Safety
is
a
personal
matter.

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The great pleasure in life is doing what people say you cannot do.
Walter Bagehot

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No one, from the beginning of time, has ever had security. When you leave your house you do not know what will happen on the other side of the door. Anything is possible. But we do not stay home on that account.
Eleanor Roosevelt

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He approaches the study of mankind with great advantages who is accustomed to the study of nature.
Henry David Thoreau

# A METHOD TO REPAIR STOCK WATERING TROUGHS USING FIBERGLASS

By
Charles E. McGlothlin*

The present method of repairing stock troughs is usually with bolts and rubber inner tubes or with tar and wooden plugs. These repairs are temporary and usually not satisfactory.

The proposed method is to reline the trough with Fiberglass. This gives a tough, lasting coating and extends its life by 5 to 10 years. To extend the life of new troughs, resin can be applied by itself.

The major advantage is that the job can be done wherever the trough is located at a much lower cost than a new trough. The trough needs to be drained and cleaned out with a steel brush. Reset the trough if necessary before applying the Fiberglass. After the trough is clean and dry apply the resin with a paintbrush. Apply the Fiberglass evenly. Start at one edge and smooth the fiber out leaving no air bubbles. Generally, only the bottoms of the troughs are leaking so it may not be necessary to line the whole trough with the Fiberglass material. Several coats of resin can be applied in one day, but usually 3 or 4 coats are sufficient. At 70° temperature, with one ounce of catalyst to one gallon of resin, it takes only 20 to 30 minutes for the resin to set up. The amount of catalyst used determines the drying time. Do not mix more resin than can be used in the 20 minutes. The Fiberglass can be placed over holes up to 2 inches in diameter and effectively stop any leaking. If necessary two layers of Fiberglass can be used over the larger holes. The resin will seal the seams of the trough. Acetone must be used to clean the resin out of the paintbrush immediately after using or the resin will set up in the brush.

To reline a 12-foot half-trough it takes the following labor and material:

| | |
|---|---|
| 1 man day @$17/day | $17.00 |
| Fiberglass - 4 ln. yd. x 44" wide @$1.95/ln. yd. | 7.80 |

*Forester, Challis Ranger District, Challis National Forest, Idaho

| | |
|---|---|
| Resin - 1 gallon for 4 coats @$7.00/gallon (The resin and catalyst are purchased together as one unit, but they come in separate containers.) | 7.00 |
| Paintbrush, 4", 1 ea. @$4.00 ea. | 4.00 |
| Acetone - 1/2 gallon | 1.00 |
| TOTAL | $36.80 |

The above cost can be reduced if the materials are bought in quantity.

Estimated savings on a new trough:

| | |
|---|---|
| 12' trough | $72.50 |
| Fittings | 10.00 |
| 1 man day | 17.00 |
| TOTAL | $99.50 |
| | 99.50 |
| | -36.80 |
| DIFFERENCE | $62.70 |

On the average, the new trough would cost $62.70 more than the relined trough.

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What you make it to the interest of
men to do, that they will do.
Edmund Burke

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When the soil is gone, man must go;
and the process does not take long.
Theodore Roosevelt

# OFF-CHANNEL PONDS FOR WATER STORAGE

By
John F. Haugaard*

Ponds for storing stock water are essential to the successful management of livestock on arid rangelands. A range area pock-marked with ponds on which the dam has failed is a grim reminder that ponds must be properly located and constructed.

One problem in pond construction is finding a place in a drainageway where soil of the right texture and structure can be found to build a dam. These areas are hard to find where sandy soils predominate. The recent development of commercial soil sealants has solved the problem of water loss due to seepage. The second part of the problem is designing the pond so it will not fill rapidly with sediment and keep dam and spillway from washing out. I believe this problem can be successfully solved as follows:

The pond site must be relatively flat. The pond is constructed by scooping out a depression to the side of the drainage that will supply the water. The dirt is "wasted" to the lower and opposite sides. A treated wood headgate, similar to that used in irrigation ditches, is installed in the drainageway. (Figures 1, 2, 3, and 4.) The level of the headgate must be adjusted to the height you want the water in the pond and should be sloped slightly toward the pond. The headgate must be large enough to accommodate the maximum flow in the channel.

A 6-inch high board is placed in the headgate before winter arrives. The board diverts water into the pond until it is full. If the water coming down the channel carries a considerable amount of debris, or if a large volume of water is expected, the height of the diversion board may be decreased to allow the debris and excess water to continue down the channel. When the pond is full, the water in the pond acts as a check valve diverting the water on down the channel that is already stabilized. If the accumulated water will last for the season it is needed, the side of the headgate discharging into the pond can be blocked off. This keeps sediment from accumulating as it does in most ponds where all the water goes through the pond. If additional water is needed the headgate can again be adjusted so it will fill from summer torrential rains.

The structure shown in the photo was installed in 1961. It has worked very well. Two more will be installed in the spring of 1965.

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*District Forest Ranger, Moab Ranger District, Manti-LaSal National Forest, Utah

Headgate for diverting water
from intermittent drainage
to stock watering pond -
(typical cross section sketch).

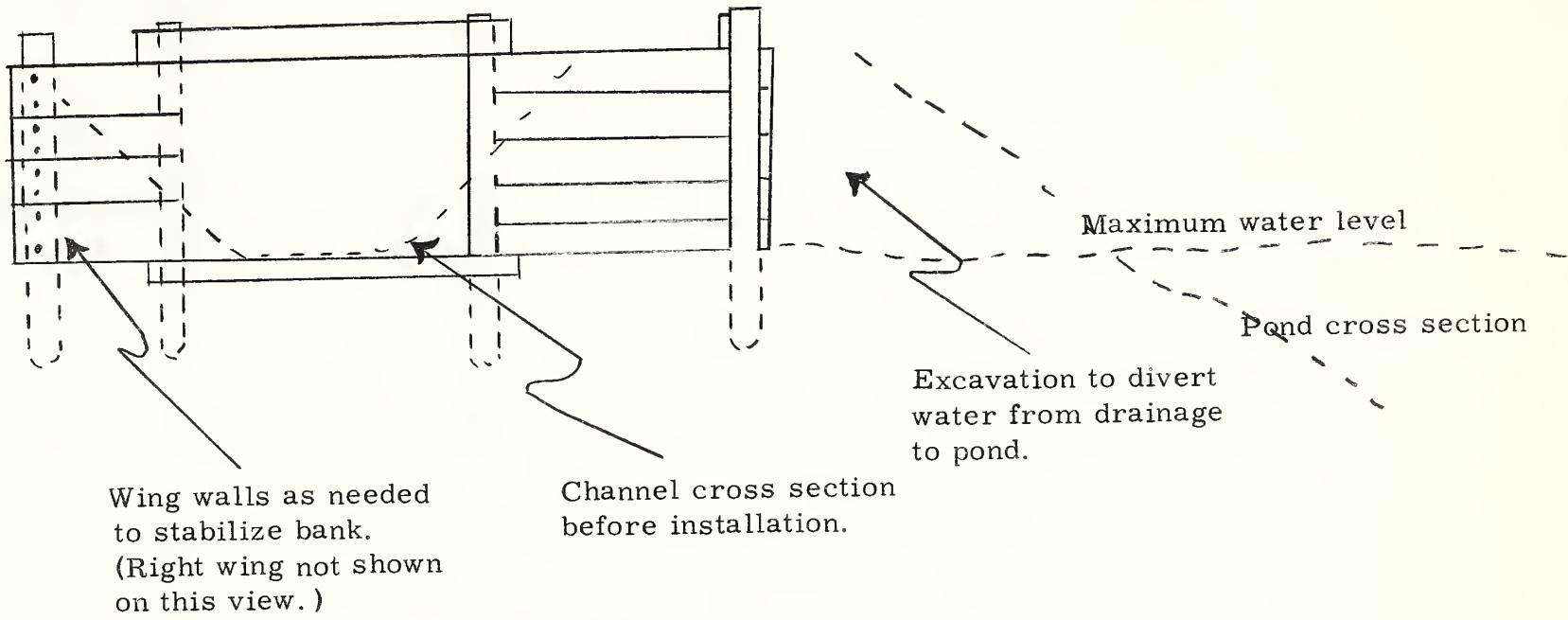
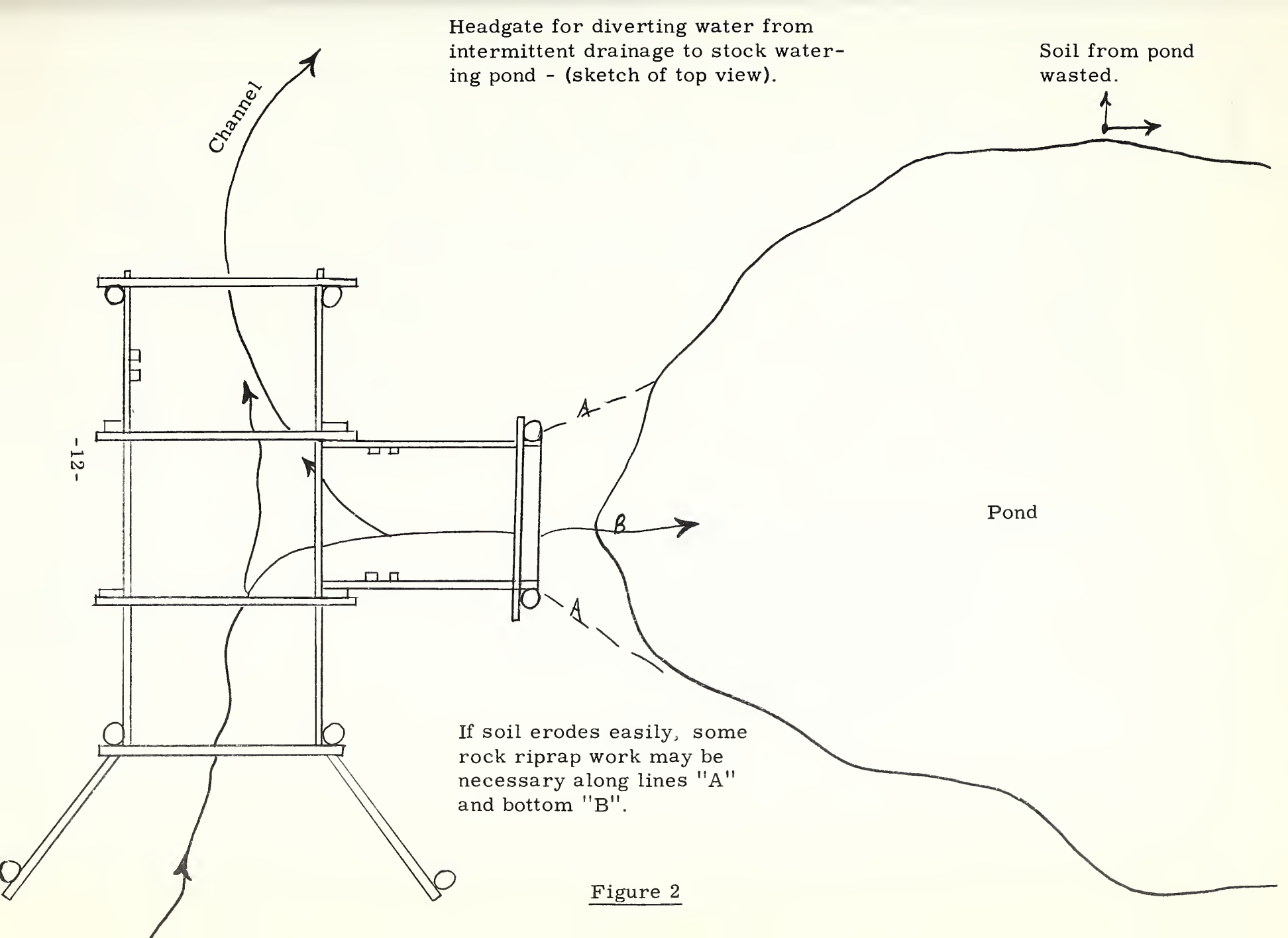



Figure 1




Headgate for diverting water from intermittent drainage to stock watering pond - (sketch of top view).

Soil from pond wasted.

If soil erodes easily, some rock riprap work may be necessary along lines "A" and bottom "B".

Figure 2

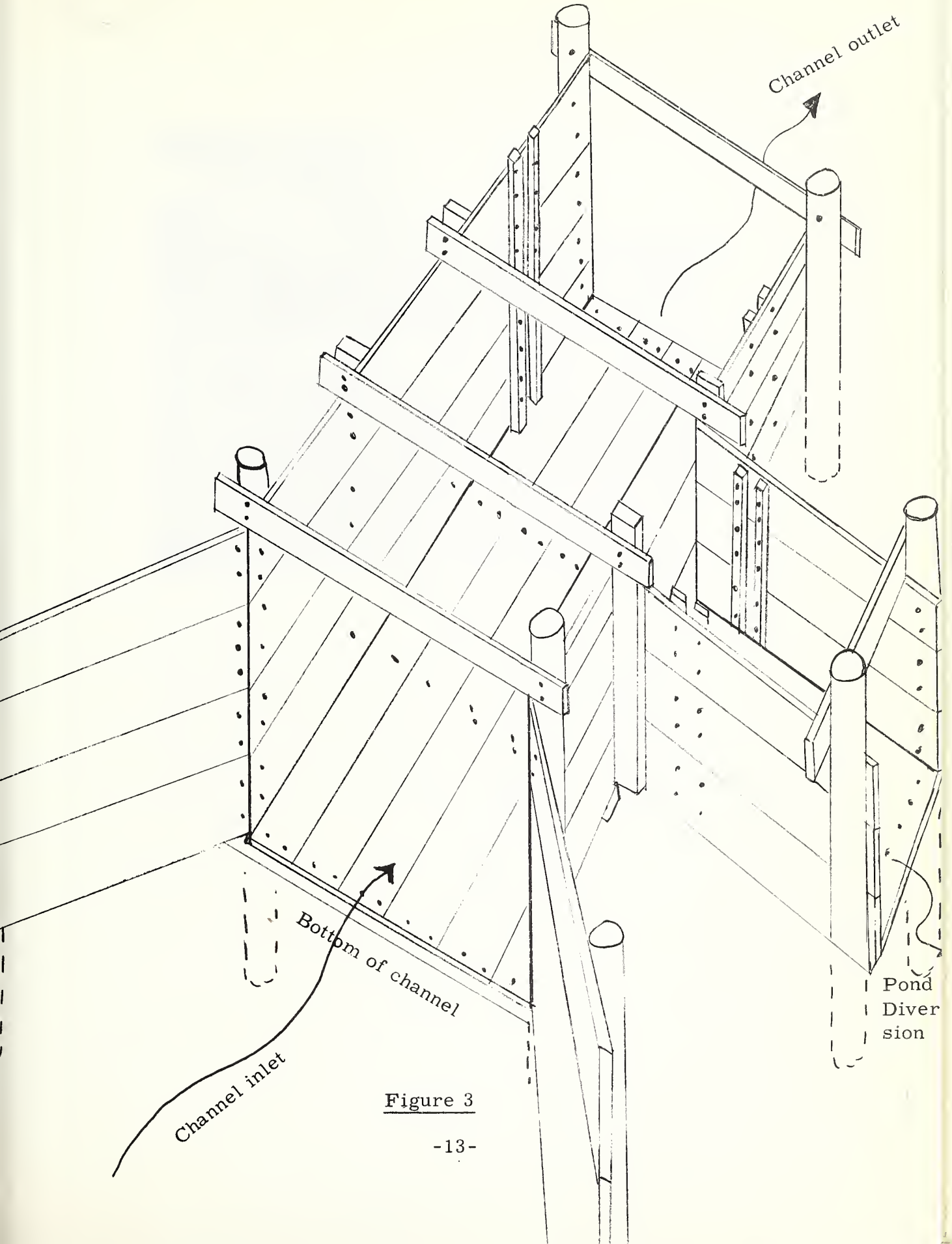

Channel outlet
Bottom of channel
Channel inlet
Pond
Diver
sion

Figure 3

Figure 4. Blue Mountain-Elk Ridge Advisory Board inspects unit installed on Beaver allotment, Moab Ranger District. There is not a specific plan for this structure. It must be adapted to each situation. The headgate must be from heavy enough material to keep cattle from damaging it. Three-inch plank is recommended. Posts were set to reinforce wing walls and anchor the whole structure.